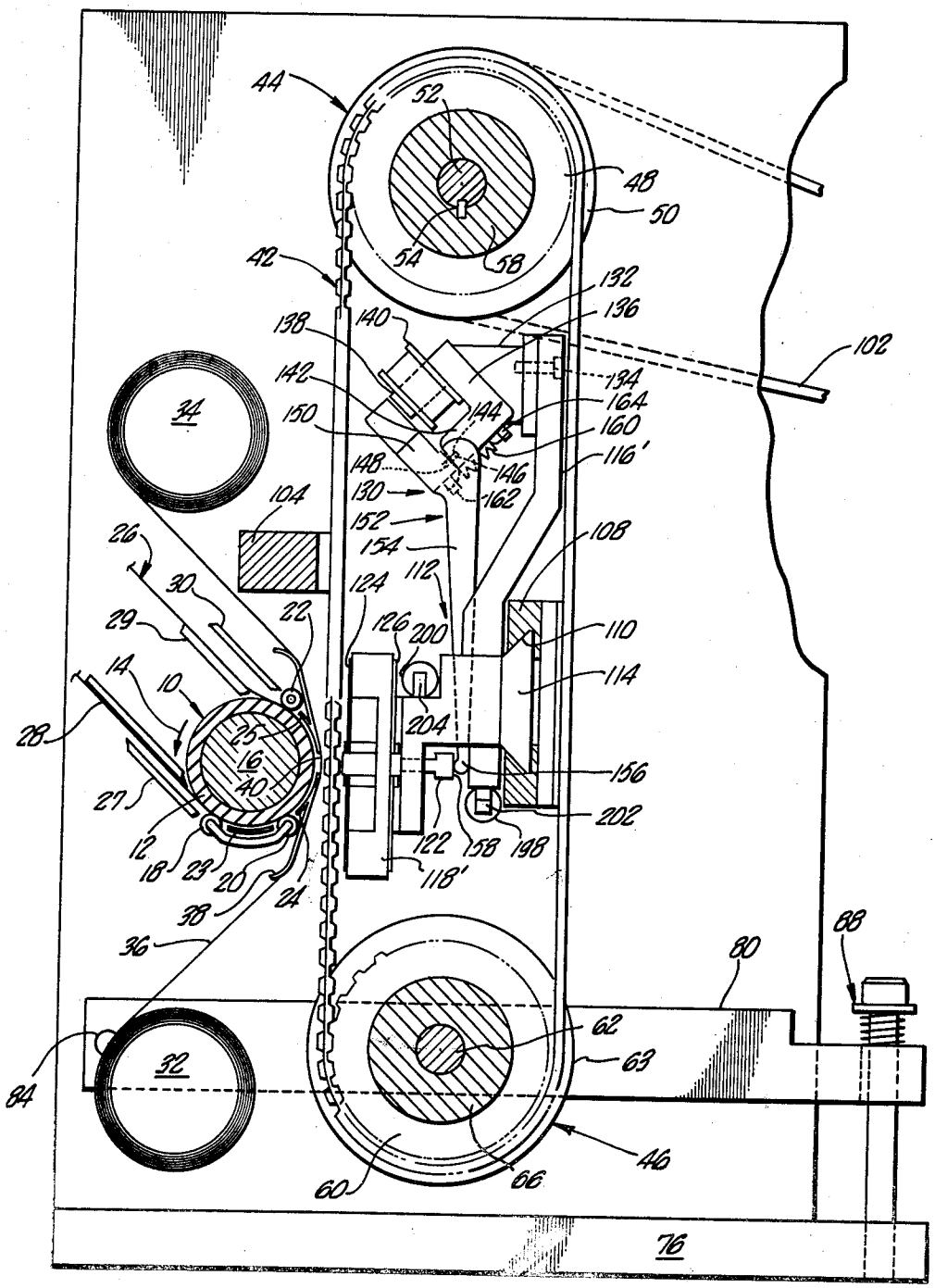
June 15, 1965 W. G. PAIGE 3,188,947

PLATEN ACTUATING MEANS IN HIGH SPEED BELT PRINTER

Filed Jan. 11, 1963

2 Sheets-Sheet 1

FIG. 1



June 15, 1965 W. G. PAIGE 3,188,947

PLATEN ACTUATING MEANS IN HIGH SPEED BELT PRINTER

Filed Jan. 11, 1963 2 Sheets-Sheet 2

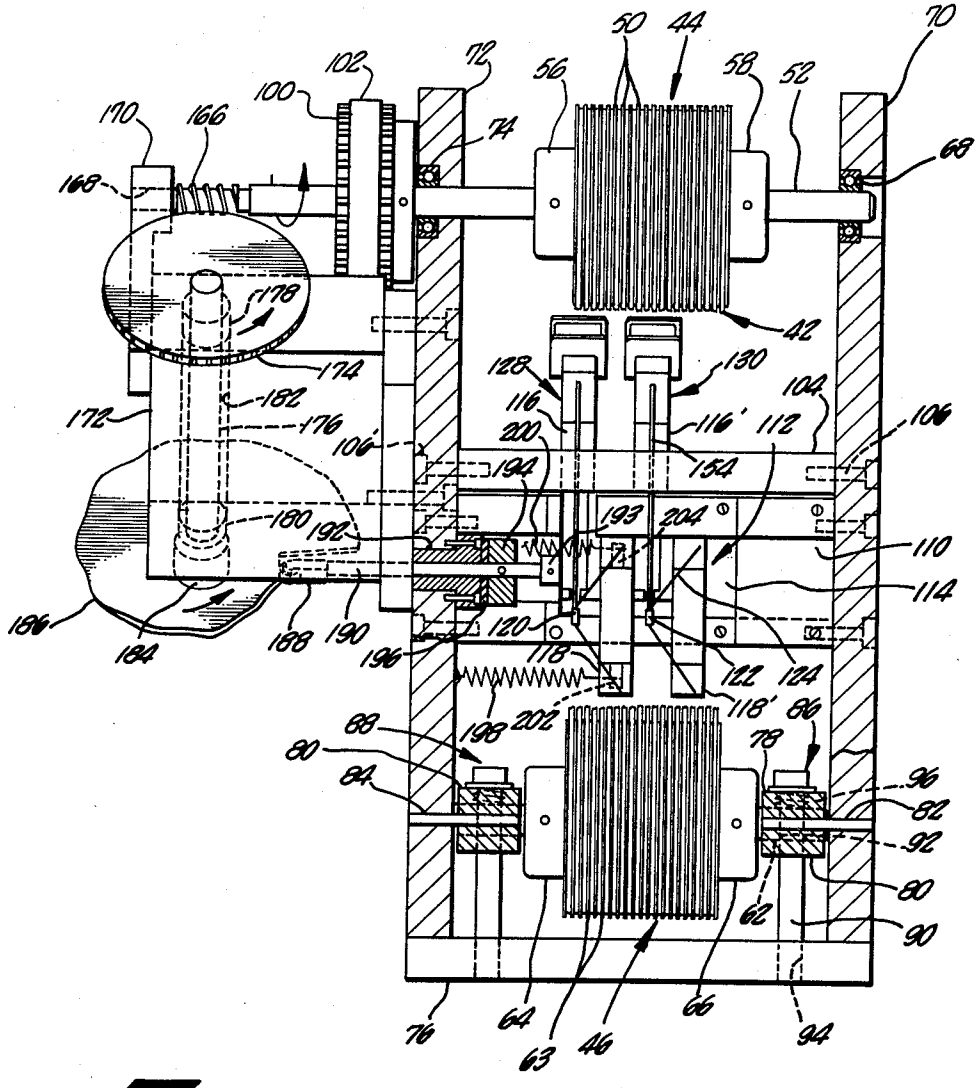


FIG. 2

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PLATEN ACTUATING MEANS IN HIGH SPEED BELT PRINTER

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This invention relates to high speed printers and, more particularly, to an improved platen printer.

Copending patent application Serial No. 167,019, filed January 18, 1962, describes a novel high speed platen printer which is capable of producing a rapid, clear and simultaneous printing of one or more print mediums of varying size and which is ideally suited for use in processes for up-dating printed records. Briefly, the high speed platen printer includes a platen and a plurality of rollers for pressing one or more sheets of print medium against the platen. Positioned adjacent the platen is a plurality of flexible, continuous belts each taking the form of a closed loop. Each belt has an array of type characters disposed on its outer surface. The belts are arranged side by side and are simultaneously driven past the platen such that the type characters pass in succession immediately adjacent to the platen. Mounted within the belt loops is a plurality of print hammers. Each print hammer is aligned with a different belt and is positioned for movement substantially normal to the platen. Also mounted within the belt loops are means for selectively actuating print hammers to propel selective type characters against the print medium.

By turning the platen in a manner similar to that of the platen on a typewriter, documents of varying size may be brought into proximity with the type characters for selective printing thereon. Also, by selectively controlling the rotation of the platen, the high speed printer may be utilized in the reprinting and up-dating of records or documents of varying sizes.

The design of the high speed platen printer represents a substantial departure from conventional high speed printer designs which do not provide means for printing on documents of varying size. In addition, the high speed platen printer is relatively inexpensive, compact and rugged in design.

However, even though the high speed platen printer is relatively inexpensive when compared to conventional high speed printers, the over-all cost of manufacture of the platen printer places the printer outside the price range of many consumers who desire a relatively high speed office printer for up-dating printed records of varying sizes.

In view of the above, the present invention represents a modification of the basic platen printer which provides a relatively low cost, medium speed printer capable of up-dating records printed on mediums of varying size.

To accomplish this, the present invention, rather than requiring a hammer and actuator for each belt, allows the use of a single hammer and actuator for a plurality of belts. Since each hammer and actuator mechanism represent a substantial unit expense in the over-all cost of manufacture of the printer, the cost of manufacture of the platen printer of the present invention is less than that of the above mentioned high speed platen printer and appreciably less than printers of conventional design having substantially the same printing speed.

To provide for such operation, the present invention employs a carriage arangement internal to the belt loops for supporting a plurality of print hamers and hammer actuating mechanisms. The print hammers are spaced from each other along the carriage such that each hammer is associated with a group of belts, the number of

belts in a group varying with the desired printing rate of the printer. The carriage positions the hammers to initially strike the first belt of each associated group of belts and is moveable in a direction substantially orthogonal to the direction of movement of the belts past the platen and through a plurality of stop positions. The stop positions are spaced from each other such that as the carriage passes through the plurality of stop positions the hammers may strike successive belts of their associated group of belts.

The carriage is driven through the plurality of stop positions and returned to its initial position by drive means synchronized with the movement of the belts. The drive means is arranged to allow the carriage to dwell in each stop position for a period of time required for a complete array of type characters to pass the platen. Accordingly, selective actuation of the hammers in each stop position produces selective printing by each belt on a print medium in a plurality of aligned character spaces oposite the belts.

By controlling the selective actuation of the print hammers the printing may be either serial or serial-parallel. For example, to provide serial printing, the hammer associated with a first group of belts is selectively actuated in each stop position and returned to its initial position before the hammer associated with a second group is actuated. This process is repeated, similar to the printing action of the ordinary typewriter, until a complete line is printed at which time the platen is turned to position the print medium for printing in a new line. For serial-parallel printing, on the other hand, the print hammers are energized in each stop position to concurrently print adjacent segments of each line.

The above, as well as other features of the present invention, may be more clearly understood by reference to the following detailed description, when considered with the drawings, in which:

FIGURE 1 is a schematic representation of a sectional side view of one form of the platen printer of the present invention; and

FIGURE 2 is a schematic representation of a sectional front view of the platen printer.

Referring to the drawings, the printer of the present invention includes a platen **10**. By way of example only, the platen **10** is represented as a drum platen having a facing of rubber-like material indicated at **12**. As indicated by the arrow **14** the platen **10** is rotatable about its longitudinal axis represented at **16** in a manner similar to the platen of a typewriter.

Associated with the platen **10** are pressure rollers **18**, **20** and **22**. The pressure rollers **18** and **20** are coupled together and press upward toward the center of the platen. The pressure roller **22** is spaced from the roller **20** around the circumference of the platen and presses inward toward the center of the platen. Spaced slightly from and following the contour of the platen **10** are guide members **23**, **24** and **25**. The guide member **23** is located between the rollers **18** and **20** while the guides **24** and **25** are located adjacent the rollers **20** and **2**, respectively. A print material, such as a paper **26**, being fed tangentially to the platen **10** is thus pressed into contact with the platen by the pressure rolers **18** and **20**. As the platen **10** is rotated (by means not shown) the paper **26** is guided by the guides **24** and **25** between the platen **10** and the pressure roller **22** to maintain pressure contact of the paper **26** with the surface of the platen **10**.

By way of example only, to feed the paper **26** tangentially to the platen, guide members represented at **27** and **28** are provided which extend adjacent the platen **10**. By means not specifically shown the paper **26** is guided along the guide **27** and forced downward by the guide member **28** in a direction tangential to the platen

10 to a point between the pressure roller 18 and the platen 10.

To guide the paper from the platen 10, guide members represented at 29 and 30 are provided. The guide members 29 and 30 are tangential to the platen 10 adjacent the pressure roller 22. Thus, as the paper 26 passes between the roller 22 and the platen 10, it extends between the guide members 29 and 30 and is passed in an upward direction away from the platen 10.

The platen 10 may be moved by any one of a number of well known apparatus. For example, the platen 10 may be controlled by a motor drive which moves the platen in steps similar to that of a typewriter platen and may stop the platen at any point to provide alignment of the paper with the print mechanism of the present invention for adding information to documents of varying sizes. An example of a drive mechanism which may be employed with the platen of the present invention is described in detail in the patent to E. J. Rabenda, 2,569,829, issued October 2, 1951.

A pair of ribbon spools 32 and 34 are located on either side of the platen 10. As illustrated, a ribbon 36 wound around the spool 32 passes over a ribbon shield 38 and over an opening 40 to the spool 34. By way of example, the guides 24 and 25 may form a part of the ribbon shield 38.

The opening 40 is immediately adjacent the platen 10 and between the rollers 20 and 22. Thus, to print on the paper extending around the platen 10, a type character may be propelled against the ribbon 36 passing over the opening 40 to press the ribbon into contact with the paper.

To provide such print operation the present invention includes a plurality of flexible continuous inwardly toothed belts 42 which are driven past the platen 10 adjacent the opening 40. The belts are aligned side by side and each aligned vertically opposite a character space on the paper 26 clamped to the platen 10. Each belt 42 includes a plurality of type characters disposed on its outer surface. Each type character is preferably aligned opposite a tooth. The teeth as well as the type characters are spaced one from the other such that in moving past the platen 10 the type characters are exposed one at a time to the platen through the opening 40.

To position the belts 42 adjacent the opening 40, the belts are arranged to pass side by side over a pair of grooved pulley arrangements 44 and 46. The pulley arrangement 44 includes a plurality of individual grooved pulleys 48 one for each belt 42. The pulleys 48 are separated by spacer members 50 and are keyed to a drive shaft 52 as represented at 54 in FIGURE 1. The pulleys 48 are maintained on the drive shaft 52 by a pair of retaining members 56 and 58 which fit around the drive shaft 52 at either end of the pulleys 48 (see FIGURE 2). The grooves in the pulleys 48 mate with the teeth of the belts 42.

The pulley arrangement 46 also includes a plurality of individually toothed pulleys 60, one for each belt 42. The pulleys 60 are aligned with the pulleys 48, mounted for free rotation about a driven shaft 62 and separated by spacer members 63. The pulleys 60 are maintained on the shaft 62 by a pair of retaining members 64 and 66 which extend around the shaft 62 at either end of the pulleys 60 (see FIGURE 2). The grooves in the pulleys 60 mate with the teeth of the belts 42.

As represented, the drive and driven shafts 52 and 62 are supported above a base member 76 in a common plane substantially parallel to and on opposite sides of the longitudinal axis of the platen 10. To provide such support, one end of the drive shaft 52 is bearing mounted at 68 to a frame member 70. The drive shaft is also journalled through a frame member 72 by a bearing arrangement 74. The frame members 70 and 72 are

supported upon and extend vertically from a base member 76 on opposite sides of the pulleys 48 and due to the bearing arrangements 68 and 74 provide substantially free rotational support for the drive shaft 52 about its longitudinal axis in a plane parallel to the longitudinal axis of the platen 10.

The driven shaft 62 is supported longitudinally by the belts 42 and is coupled at opposite ends to the central portion of a pair of lever arms 78 and 80. The arm member 78 is hinged at one end by a pin 82 to pivot from and parallel to the frame member 70 while the arm member 80 is hinged by a pin 84 to pivot from and parallel to the frame member 72. In this manner, the driven shaft 62 extends longitudinally between the arm members 78 and 80 and due to its own weight exerts a downward force on the belts 42 to tension the belts in passing over the plurality of pulleys 48 and 60.

To control the tension in the belts 42, spring-loaded screw arrangements 86 and 88 are provided at the free ends of the arm members 78 and 80, respectively, to exert a controlled downward force on the arms and hence a downward force on the belts 42. The screw arrangements are substantially the same, accordingly, only the screw arrangement 86 associated with the arm 78 will be described in detail. As illustrated, the screw arrangement 86 includes a vertical screw member 90 which extends through a hole 92 in the arm 80 and into a threaded hole 94 in the base member 76. A spring member 96 extends around the hole 92 between the upper surface of the arm 78 and the head 98 of the screw member 90. By turning the screw member 90 the compression of the spring 96 is adjusted to control the magnitude of the downward force exerted on one end of the driven shaft 62 and hence the tension on the belts 42. By making a similar adjustment of the screw arrangement 88 the tension of the belts 42 is controlled to reduce any tendency of the belts to whip away from the pulleys 48 and 60 when driven at high speeds to a minimum.

To impart movement to the aligned belts 42 to transport type characters opposite the opening 40, a pulley member is pinned to and extends around the drive shaft 52. The pulley member 100 receives a driven belt 102 which is coupled to be driven by a motor (not shown). Movement of the belt 102 imparts rotational movement to the pulley 100 which, in turn, rotates the drive shaft 52 and the pulleys 48. The rotation of the pulleys 48 drives the belts 42 around the pulleys 60 and past the opening 40.

As the belts 42 are driven at a high speed past the opening 40 the lateral position of the belts as well as any tendency of the belts to whip in a lateral direction is controlled by a comb member 104. The comb member 104 is coupled by screw members 106 and 106' to the frame members 70 and 72, respectively. The comb member 104 extends substantially normal to the frame members and includes a plurality of fingers which extend between adjacent belts 42 to provide a lateral guiding of the belts adjacent the opening 40.

To provide means for selectively propelling type characters carried by the moving belts against the paper 26 a plurality of print hammers (120 and 122) and actuator mechanisms (128 and 130) are mounted between the pulleys 48 and 60 internal to the loop of the belts 42.

To provide support for the print hammers and actuator mechanisms such that a single hammer and actuator may be utilized for a plurality of belts, a guide member 108 is coupled by a plurality of screws between the frame members 70 and 72 within the loop of the belts 42. The guide member 108 includes a trapezoidal shaped slot 110 which extends longitudinally between the frame members.

Supported by the guide member 108 is a carriage member 112. The carriage member 112 includes a trapezoidal shaped slide portion 114 dimensioned for sliding

movement within the slot 110, a plurality of upwardly extending actuator brackets, two of which are represented as 116 and 116', and a plurality of print hammer support brackets such as 118 and 118'. The hammer and actuator brackets are spaced from each other along the carriage 112 to support the hammers and actuator mechanisms. In particular, the hammer support brackets 118 and 118' support the print hammers 120 and 122, respectively. The hammers are lightweight, elongated, projectile type hammers and are each coupled to their associated brackets by a pair of bent wire members for longitudinal movement normal to the belts 42. As illustarted most clearly in FIGURE 1, for the hammer 122, a bent wire 124 extends between upper and lower portions at the front of the bracket 118' to contact and support a front section of the hammer 122 while a bent wire 126 extends between upper and lower portions at the back of the bracket 118' to contact and support a rear portion of the hammer 122 Due to the alignment of the carriage 112 and its supporting elements, the hammers 120 and 122 are initially arranged to strike the inner surface of the first and eleventh belts and are each associated with ten of the twenty belts illustarted.

The hammer actuator brackets 116 and 116' support actuator mechanisms 128 and 130 in alignment with the hammers 120 and 122, respectively. The actuator mechanisms 128 and 130 are substantially the same, therefore only the actuator 130 will be described in detail. The actuator mechanism 130 includes a non-magnetic base 132 coupled to the actuator bracket 116' by a screw member 134. Coupled to the base member 132 is a magnetic U-shaped field structure 136. A leg 138 of the field structure 136 supports a coil 140.

As illustrated, a leg 142 of the field structure 136 includes a slot 144 into which is tightly inserted a tongue member 146. The tongue member 146 is also positioned into a slot 148 which extends into a solid magnetic portion 150 of an armature 152. The armature 152, in addition to the solid portion 150, which extends adjacent the coil 140, also includes an arm member 154. The arm member 154 is attached to the portion 150 as indicated and extends downward adjacent the hammer 122.

Attached to the lower end of the arm member 154 is a second solid member 156. The solid member 156 is positioned to strike a rear face 158 of the hammer 122 when the actuator 130 is energized.

A spring member 160 is coupled by pins 162 and 164 between the member 150 and the leg 142. The spring normally urges the armature 152 to pivot about a point defined by the tongue 146 and the slot 148, thereby maintaining the member 150 away from the coil 140.

To excite the actuator 130 a pair of conductors (not shown) are coupled to the coil 140. In response to a current signal applied to the conductors, the coil 140 is momentarily energized to develop a magnetic field which rapidly attracts the armature causing the arm 154 to strike the rear face 158 of the hammer 122. The hammer, supported by the wire members 124 and 126, is propelled toward one of the belts 42. The armature 152 returns rapidly to its normal position due to the spring force supplied by the spring member 160. The excitation of the actuator is timed so that the hammer 122 strikes a tooth on the belt to force a type character against the ribbon 36. The ribbon 36, in turn, presses against the paper 26 clamped to the platen 10 to produce a printing thereon in one of the aligned character spaces opposite the belts 42. After the type character presses against the ribbon 36, the hammer 122 rapidly rebounds to its normal position, ready to again be propelled against a belt.

As briefly discussed, the printer of the present invention provides an extremely economical design by utilizing a single print hammer and actuating mechanism for a plurality of type carrying belts. To enable a single hammer and actuating mechanism to produce a selected

printing with a plurality of belts, the present invention provides means for selectively stepping the carriage 112 through a plurality of stop positions together with means for returning the carriage to its original position at the completion of a predetermined number of steps. A stop position is associated with each belt in the plurality of belts asociated with each print hammer. As previously described, for the embodiment illustrated each print hammer is associated with ten belts. Accordingly, the plurality of belts include ten belts. In such an arrangement the carriage 112 is aligned in an initial stop position with the hammers 120 and 122 aranged to strike the first and eleventh belts and is stepped through nine stop positions, one associated with each remaining belt of the pluralities of belts. In each stop position for the carriage 112, the print hammers and actuating mechanism are aligned with one of the type carrying belts such that actuation of the print hammers in successive stop positions produces consecutive printing in the plurality of aligned character spaces opposite the belts 42.

The movement of the carriage through the plurality of stop positions is synchronized with the movement of the type carrying belts and is substantially orthogonal thereto. To impart such movement to the carriage 112, in the form of the present invention illustrated, the drive shaft 52 extends beyond the pulley 100 and is shaped to form a worm 166. The end of the worm 166 is supported for rotation in an opening 168 of a bracket member 170. The bracket member 170 is coupled to a support member 172 which is secured by a plurality of screw members to the frame 72.

The worm 166 mates with a worm wheel 174. The worm wheel 174 is coupled to a shaft 176 which, as illustrated, is bearing mounted at 178 and 180 to extend through an opening 182 in the support member 172.

Coupled to the end of the shaft 176 remote from the worm wheel 174 and supported by a hub 184 is a cam 186. The circumferential surface of the cam 186 is shaped in a spiral form having its outer surface divided into a plurality of sectors of constant radial dimension. In the embodiment illustrated the cam is divided into ten sectors. The length of each sector is such that the time required for the cam to turn through any sector is equal to the time required for an entire array of type characters carried by a belt to pass the platen 10. The radial dimension of each sector differs from the radial dimension of each other sector by an amount equal to the spacing between adjacent belts 42.

Making rolling contact with the circumferential surface of the cam 186 is a cam follower 188. The cam follower 188 is coupled to a pushrod 190. The pushrod 190 extends through a bushing 192 in the frame members 72 and is pinned to a side of the carriage 112 as illustrated at 193 in FIGURE 2. The pushrod 190 also supports a stop member 194 including a rubber washer 196. The stop member is pinned to the pushrod and when the carriage 112 is in its initial position, as illustrated, rests against the exposed face of the bushing 192.

With the above arrangement, movement of the pulley 100 in response to the motor drive (not shown) produces a rotation of the drive shaft 52. The rotation of the drive shaft 52 causes the belts 42 to travel in a direction transverse to the plane of the hammers 120 and 122 to transport the type characters carried thereby in succession adjacent the opening 40 and in line with the plurality of aligned character spaces on the paper 26 clamped to the platen 10. Rotation of the drive shaft 52 also produces a turning of the worm 166 in synchronism with the movement of the belts 42. The worm 166 engages the worm wheel 174 to produce a rotation thereof and a rotation of the shaft 176. The rotation of the shaft 176, in turn, produces a rotation of the cam 186. As the cam 186 rotates, the cam follower 188 travels along the circumferential surface of the cam through a first sector of the cam. The first sector is of constant

radial dimension and the cam follower and pushrod 190 remain substantially in the position illustrated in FIGURE 2.

As previously mentioned, the length of each sector is such that the time required for the cam follower 188 to travel from the beginning to the end of the first sector is equal to the time required for a complete array of type characters to be carried by the belts 42 past the platen 10. Thus, the pushrod 190 remains stationary while a complete array of type characters pass the platen 10.

At the end of the first sector the cam follower 188 rotates with the cam 186 into the second sector which has a greater radial dimension than the first sector by an amount equal to the displacement between adjacent ones of the plurality of belts. Thus, the pushrod 190 is moved to the right to move the carriage 112 by an amount equal to the displacement between adjacent ones of the belts. Accordingly, the hammers 120 and 122 become aligned with a second belt of their associated group of belts and remain so aligned while the cam follower 188 travels from the beginning to the end of the second sector. This process is repeated for each sector of the cam 186 until the cam follower 188 reaches the end of the last or tenth sector. In this position the carriage 112 has moved through nine stop positions and aligns the hammers 120 and 122 with the last or tenth belt in the associated groups of belts.

At the end of the last sector the circumferential surface of the cam 186 takes a relatively large inward step to return to the start of the first sector. To cause the pushrod 190 and cam follower 188 to take such a step and to return the carriage 112 to its initial position spring members 198 and 200 are employed. The springs 198 and 200 are coupled between the frame member 72 and a pair of lugs 202 and 204 carried by the carriage 112. As the carriage is moved away from the frame member 72 the springs are stretched and develop a spring force toward the frame 72. When the cam follower 188 reaches the end of the last sector of the cam 186, the spring forces developed in the springs 198 and 200 cause the carriage 112 to rapidly return to its initial position as determined by the radial dimension of the first sector of the cam 186. As the carriage moves to its initial position, the washer 196 of the stop member 194 contacts the exposed face of the bushings 192 to cushion the return of the carriage 112 and to buffer the contact of the cam follower 198 with the first sector of the cam 186.

Thus, in the present invention, the plurality of flexible type carrying belts 42 are rapidly moved adjacent the platen 10. As the belts are moving, print hammers associated with different predetermined groups of the belts are selectively stepped through a plurality of stop positions in synchronism with the movement of the belts and in a direction substantially orthogonal thereto. The selective actuation of the print hammers in each stop position then produces a printing in adjacent character spaces on a print medium clamped to the platen. In this manner, the printer of the present invention provides for relatively high speed printing on documents of varying size at a substantial reduction in cost over prior platen printers.

What is claimed is:

1. In a platen printer for printing a plurality of characters in a plurality of aligned character spaces on a print medium adjacent a platen,
- a plurality of continuous belts each carrying an array of type characters on a surface facing the platen, one belt being aligned with each character space,
- means for moving all the belts in a direction to transport the type characters of each belt in succession adjacent the platen to face an associated character space,
- a print member for striking a surface of any of said belts on the side remote from the platen to press a type character against the print medium within a character space,
- and means for imparting movement to the print member in a direction substantially orthogonal to the direction of longitudinal movement of the belts and parallel to the platen such that successive actuation of the print member may produce a printing by different belts in different character spaces.

2. In a platen printer for printing a plurality of characters in a plurality of aligned character spaces on a print medium adjacent a platen,
- a plurality of continuous belts each carrying an array of type characters on a surface facing the platen, a belt being aligned with each character space,
- means for simultaneously moving the belts in a direction to transport the type characters of each array in succession adjacent the platen to face an associated character space,
- associated print member initially aligned with a belt and a character space for striking a surface of the belt remote from the platen to press a type character against the print medium within the character space,
- and means for imparting to the print member in a direction substantially orthogonal to the direction of movement of the belts and parallel to the platen to effectively step the print member into alignment with successive belts, said means for imparting relative movement including means for returning the print member to its initial position of alignment when a predetermined number of steps have been completed.

3. The apparatus defined in claim 2 wherein the means for imparting movement includes means for causing the print member to dwell in alignment with each belt for a period of time required for a complete array of type characters to pass a character space.

4. In a platen printer for printing a plurality of characters in a plurality of aligned character spaces on a print medium adjacent a platen,
- a plurality of continuous belts each in the form of a closed loop and each carrying an array of type characters on its outer surface, one belt being aligned with each character space,
- means for moving the belts in a direction to transport the type characters of a moving belt in succession directly opposite the associated character space,
- a print member for striking an inner surface of a belt to press a type character against the print medium within a character space,
- support means for supporting the print member within the loop of the belts for movement toward the platen,
- means coupled to the support means for actuating the print member,
- and means for imparting movement to the support member in a direction substantially orthogonal to the direction of movement of the belts and parallel to the platen to bring the print member into striking alignment with any selected belt.

5. The apparatus defined in claim 4 wherein the means for imparting movement includes means for causing the print member to dwell in alignment with each belt for a period of time required for a complete array of type characters to pass a character space.

6. In a platen printer for printing a plurality of characters on a print medium clamped to a platen,
- a plurality of belts each carrying an array of type characters on a surface facing the platen,
- means for aligning the belts side by side adjacent the platen,
- means for moving the belts to transport the type characters in succession adjacent the platen,
- a print member for striking a surface of a belt remote from the platen to press a type character against the print medium,
- and means for imparting relative movement between

the platen and the print member substantially orthogonal to the direction of movement of the belts to effectively step the print member through a plurality of stop positions, the stop positions being spaced such that actuation of the print member in successive stop positions causes the print member to strike different belts.

7. In a platen printer for printing a plurality of characters on a print medium clamped to a platen,

a plurality of belts each carrying an array of type characters on a surface facing the platen,

means for aligning the belts side by side adjacent the platen,

means for moving the belts to transport the type characters in succession adjacent the platen,

a print member initially aligned with a belt for striking a surface of the belt remote from the platen to press a type character against the print medium,

means for advancing the print member through a plurality of stop positions in successive alignment with each of the belts, and means for returning the print member to its initial position of alignment when a predetermined number of stop positions have been completed.

8. The apparatus defined in claim 7 wherein the advancing means includes means for causing the print member to dwell in each stop position for a period of time required for a complete array of type characters to pass the platen.

9. In a platen printer for printing a plurality of characters on a print medium clamped to a platen,

a plurality of belts each in the form of a closed loop carrying an array of type characters on its outer surface,

means for aligning the belts side by side adjacent the platen,

means for moving the belts to transport the type characters in succession past the platen,

a print member for striking an inner surface of a belt to press a type character against the print medium,

support means for supporting the print member within the loop of the belts in initial alignment with a belt,

actuating means coupled to the support member for actuating the print member,

and means for imparting relative movement between the platen and the support member substantially orthogonal to the direction of movement of the belts and parallel to the platen to effectively step the print member into striking alignment with each belt.

10. The apparatus defined in claim 9 wherein the means for imparting relative movement includes means for causing the print member to dwell in each stop position for a period of time required for an array of type characters to pass the platen.

11. In a platen printer for printing a plurality of characters on a print medium clamped to a platen,

a plurality of belts each in the form of a closed loop and each carrying an array of type characters on its outer surface,

means for aligning the belts side by side adjacent the platen,

means for moving the belts to transport the type characters in succession past the platen,

a frame member,

a guide member coupled to the frame member and extending within the loop of the belts,

a slide member supported by the guide member within the loop of the belts for sliding movement orthogonal to the direction of the movement of the belts,

a print member supported by the slide member for striking the inner surface of a belt to press a type character against the print medium,

means carried by the slide member for actuating the print member,

and means synchronous with the moving of the belts for moving the slide member relative to the platen transverse to the direction of movement of the belts past the platen to effectively step the print member from successive alignment with each belt to return to its initial position after the completion of a predetermined number of steps.

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